

On a few old and new soft scales and mealybugs
(Homoptera: Coccoidea)

by

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This paper presents records and descriptions of a few mealybugs and soft scales from cultivated plants, recently submitted for study from various countries from Africa south of the Sahara and from North America.

As our knowledge of the soft scales (Coccoidae) improves, it becomes more and more evident that the identification and classification of species will to a large extent be based on the glandular structures of the derm, of which there seem to be numerous types. Besides the study of their form, efforts should be made to devise an appropriate terminology, especially for those which, being widely recurrent, play a more significant rôle in the organography of the group. To this end the term "clistostomatic ducts" is here proposed as a substitute for the more generic, somewhat pleonastic appellative "tubular ducts" of current usage.*

Other terms will be introduced as the need and opportunity arise.

Ceroplastes hololeucus spec. nov., fig. 1

Inmature adult females flattish, disc-like in shape; wax test faintly divided into plates: three bilateral, one cephalic and one dorsal; at the centre of each of them there is a small elongate boss; colour of the test in material stored in alcohol evenly white; wax rather brittle in texture. Mounted specimens very broadly elliptical to roughly circular in outline; dimensions of the graphotype: length 1.3 mm, width 1.0 mm. Lateral, cephalic and dorsal membranous processes obsolete; caudal process short, conical, strongly sclerotized. Dorsal setae small, spiniform. Dorsal dendritic pores of the simple type with two—occasionally three—loculi. Anal opercula 125–135 μ long, combined width 125–135 μ ; each operculum carries three discal or subdiscal longish robust setae, and a small one near the apex. Stigmatic spines conical with the apex

*The ducts of the clistostomatic type are histologically similar to those of the mealybugs but differ in that they are devoid of any oral feature, such as rim, collar, patch, etc., and in having the diaphragm between the outer and inner ductlets invaginated. Moreover, at the beginning of the adult stage their orifice is tightly closed and gradually opens only when the insect reaches maturity, which certainly implies a physiological function unlike that of the mealybugs' ducts. A detailed study of the form of the ducts in question and their possible use in the generic classification of the soft scales was made by Steinweden (1929). Besides being common to all Coccoidae, they occur also in Eriococcidae, Dactylopiidae and some Asterolecaniidae. In Pseudococcidae ducts referable to the clistostomatic type have been observed by me in the interantennal area of *Macrocerococcus superbus* Leonardi, 1907; in *Rastrococcus iceryoides* (Green, 1908); and in a new mealybug from South Africa provisionally assigned to the genus *Spinococcus* (De Lotto, 1969).

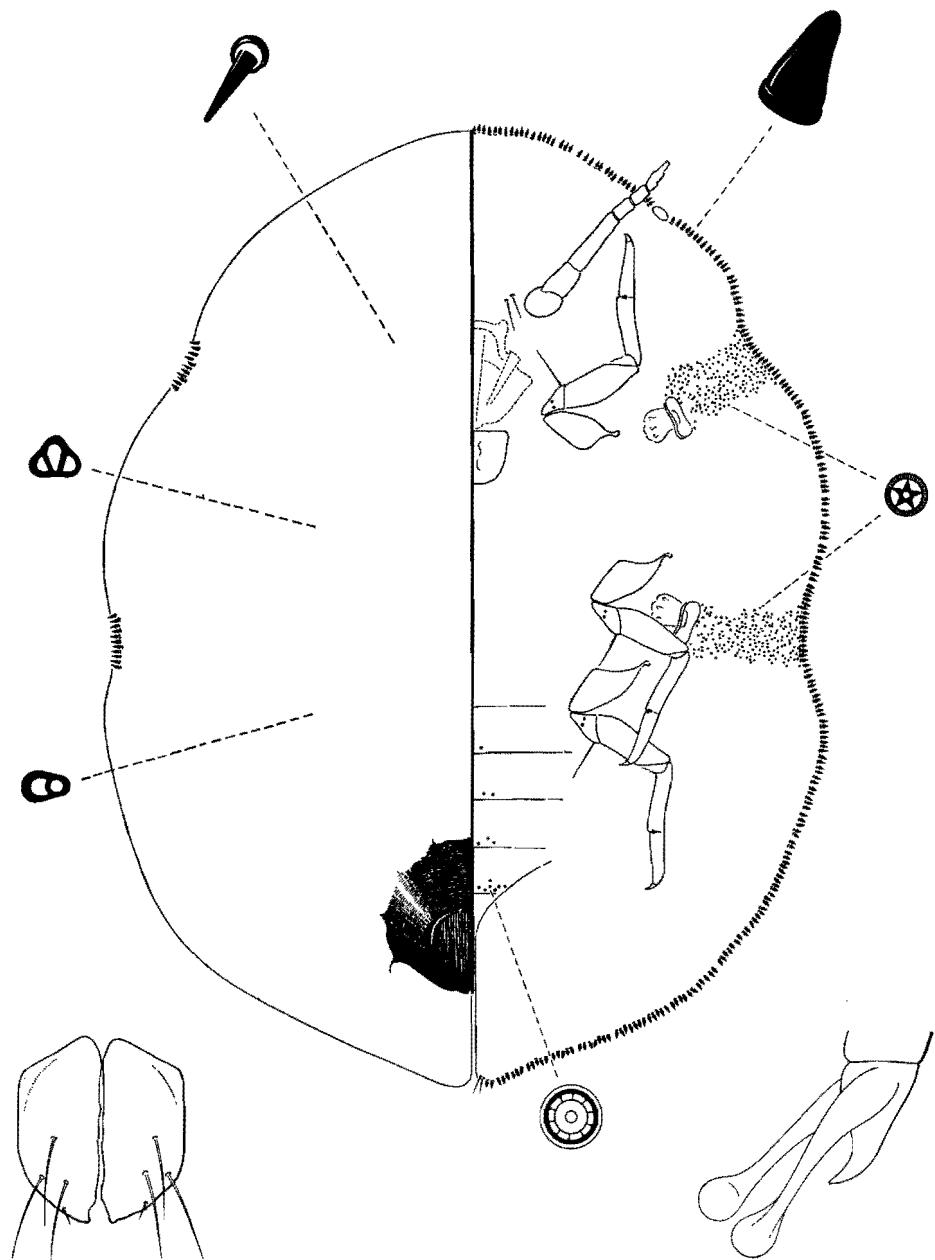


Fig. 1. *Ceroplastes hololeucus* spec. nov.

pointed or bluntly rounded, all subequal in size; at the centre of the clefts the spines are two or three deep, thinning out to a single fairly regular uninterrupted row all along the margin of the body. Clistostomatic ducts entirely absent. Multilocular pores fairly numerous around the genital opening and a few extending on the midarea of the preceding abdominal segments. Quinquelocular pores numerous and arranged in wide irregular transverse bands. Legs all well developed with a moderately to strongly marked tibio-tarsal articulatory sclerosis; ungual digitules not differentiated in shape and size, both stout and knobbed at the apex; claws without denticle; dimensions of L (iii): trochanter plus femur 140–160 μ , tibia plus tarsus 155–160 μ . Antennae 6-segmented, total length 265–280 μ . Eyes small.

MATERIAL EXAMINED. ANGOLA. Novo Redondo: 10.iii.1967, ♀-holotype and 3 ♀-paratypes collected on *Elaeis guineensis* Jacq. (Palmae) (H. Cardoso); coll. No. H.C. 3439. The whole series is deposited in the National Collection of Insects, Plant Protection Research Institute, Pretoria.

This species bears a very close resemblance with *C. japonicus* Green, 1921, but differs from it in that the stigmatic spines extend along the whole margin of the body. Furthermore in *hololeucus* all dorsal dendritic pores are of the simple type, while in Green's species most of them are of the modified type.

Coccus acrossus spec. nov., fig. 2

Living adults not seen. Immature females when mounted oval or elliptical in outline, often distorted; dimensions of the graphotype: length 1·8 mm, width 1·2 mm. Dorsal derm membranous without any sclerotized pattern. Dorsal pores very small, few and widely scattered. Dorsal setae very slender, finely pointed, straight or curved; all are borne on an unusually large socket; on the submarginal area the setae are arranged in irregular radiating rows. Para-opercular pores apparently strongly convex, but their actual shape could not be seen; they are set in two separated groups roughly situated midway between the anterior and posterior ends of the body; each group is formed by 5 to 13 pores. Submarginal pores absent. Anal opercula together roughly quadrate with the lateral posterior margin often slightly constricted on the middle; length 170–190 μ , combined width 180–200 μ ; each operculum carries four very small setae at or near the apex. Marginal setae entirely absent, except two inserted at the apex of each anal lobe. Stigmatic spines three, digitiform, all alike; median 25–35 μ long, laterals 20–30 μ . Multilocular pores rather few around the genital opening and extending in very loose transverse rows on all preceding abdominal segments. Quinquelocular pores set in bands two pores wide. Clistostomatic ducts lacking. Legs rather short, with tibia and tarsus fused together; claws without denticle; one of the ungual digitules is fairly stout, the opposite one slender and somewhat shorter, both are knobbed at the apex; dimensions of L (iii): trochanter plus femur 95–105 μ , tibio-tarsal podite 125–135 μ . Antennae reduced to three segments only, of which the first (scape) and the second (pedicel) present nothing distinctive while the third is unusual long, at times marked by a pseudoarticulation; total length 210–245 μ . Fold of the ano-genital invagination with altogether four rather robust subequal setae. Interantennal and submedian setae on the (viii) to (vi) abdominal segments absent; they are replaced by several very minute ones.

MATERIAL EXAMINED. ANGOLA. Novo Redondo: 16.iii.1967, ♀-holotype and 5 ♀-paratypes collected on *Elaeis guineensis* Jacq. (Palmae) (H. Cardoso); coll. No. 3034.

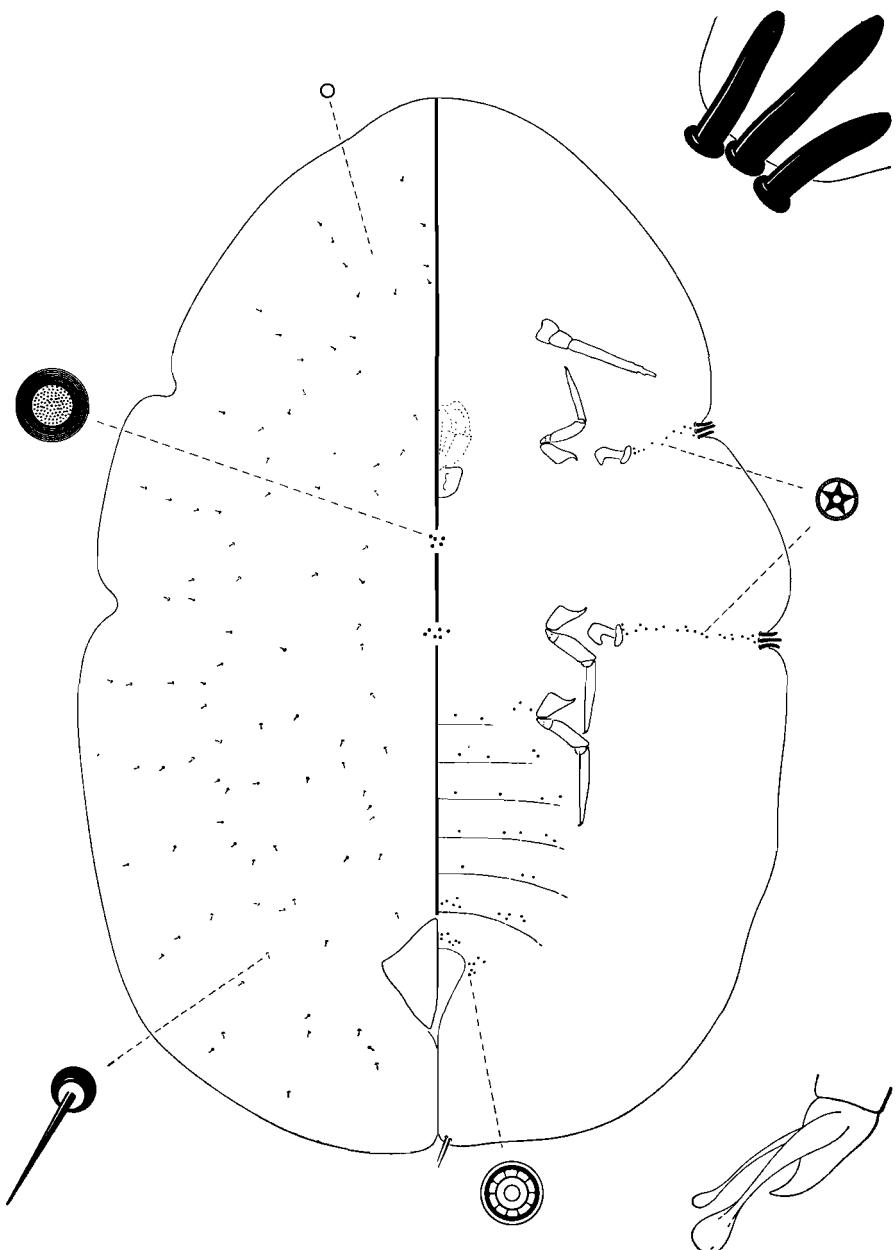


Fig. 2. *Coccus acrossus* spec. nov.

The whole series is deposited in the National Collection of Insects, Plant Protection Research Institute, Pretoria.

The arrangement of the para-opercular pores together with the total absence of setae or spines along the margin of the body, promptly distinguish this species from all congeneric forms at present known from Africa south of the Sahara.

Coccus celatus De Lotto, 1960

This green scale was described from Uganda from specimens found on the underside of leaves of arabica coffee. Its occurrence in the Kenya highland has not been recorded before.

MATERIAL EXAMINED. KENYA. Ruiru: 10.iii.1968, on *Coffea arabica* Linn. (Rubiaceae) (*H. Baum*).

Coccus viridulus De Lotto, 1960

The case of this species is the reverse of that *celatus*: originally described from Kenya, this is its first record from Uganda.

MATERIAL EXAMINED. UGANDA. North Bugisu, Bufumbu: 15.iii.1963, on *Coffea arabica* Linn. (Rubiaceae) (*D. N. McNutt*).

Dysmicoccus brevipes (Cockerell, 1893)

MATERIAL EXAMINED. ANGOLA. Cela: 18.i.1966, on *Ananas sativus* Linn. (Bromeliaceae) (*H. Cardoso*). Benguela: 17.iii.1967, on *Elaeis guineensis* Jacq. (Palmae) (*do.*).

Erium pygmaeum (De Lotto, 1961) **comb. nov.**

This species was described from specimens collected in Nairobi (Kenya) on roots of *Themeda triandra* Forsk. (Graminaceae). The material listed below agrees well with the original diagnosis.

MATERIAL EXAMINED. TANZANIA. Kilosa: 15.x.1968, on roots of *Saccharum officinarum* Linn. (Graminaceae) (*P. Witterveen*).

Ferrisia virgata (Cockerell, 1893)

MATERIAL EXAMINED. ANGOLA. Salazar: 14.iv.1966, on *Codiaeum variegatum* Linn. (Euphorbiaceae) (*H. Cardoso*).

Gascardia constricta spec. nov., fig. 3

The covering waxy test of all specimens examined was badly damaged in transit; in texture the wax was brittle and pure white in colour. Immature females when mounted roughly broadly elliptical in outline, with the stigmatic clefts deep and rather narrow; dimensions of the graphotype: length 1.3 mm, width 1.1 mm. Lateral, cephalic and dorsal membranous processes obsolete. Caudal process short, conical, strongly sclerotized. Dorsal setae minute, spiniform with the apex bluntly rounded; very numerous. Dorsal dendritic pores of the simple type with two—occasionally three—loculi; rather few. Anal opercula 135–155 μ long, combined width 155–160 μ ; each operculum carries four robust longish discal setae, and a small one near the apex. Stigmatic spines all dome-shaped and subequal in size, except one situated near the outer edge of the group which is appreciably larger; each group is formed by 70 to 90 spines. Clistostomatic ducts entirely absent. Multilocular pores crowded around the

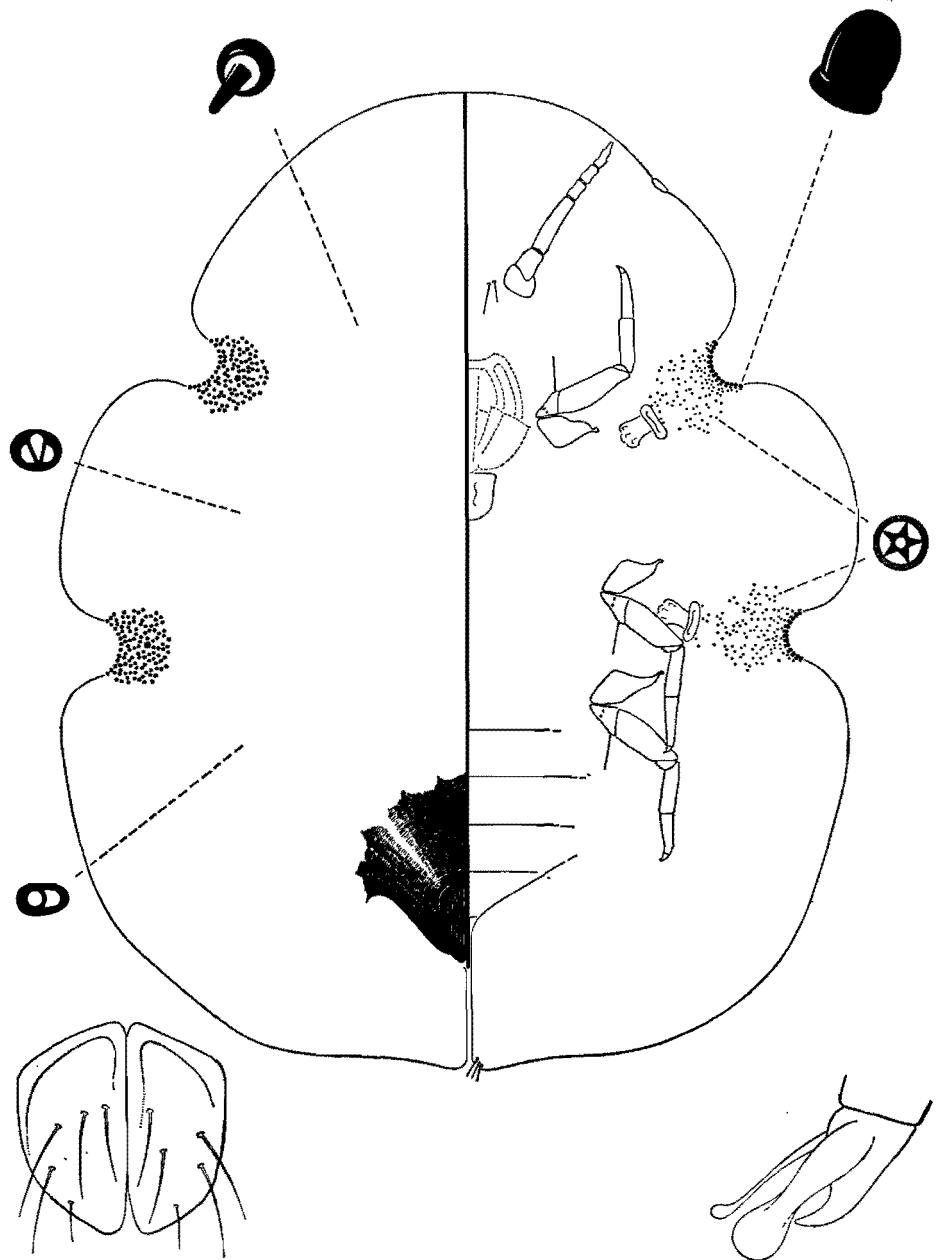


Fig. 3. *Gascardia constricta* spec. nov.

genital opening and on the last abdominal segments. Quinquelocular pores numerous and arranged in very irregular groups between the stigmatic openings and stigmatic clefts. Legs all fairly well developed, without tibio-tarsal articulatory sclerosis; one of the ungual digitules is stout, the opposite one very slender, both are knobbed at the apex; dimensions of L (iii): trochanter plus femur 125–145 μ , tibia plus tarsus 125–140 μ . Antennae 6-segmented, at times with a pseudoarticulation on the third segment; total length 230–260 μ . Eyes small.

MATERIAL EXAMINED. ANGOLA. Novo Redondo: 11.iii.1967, ♀-holotype and 13 ♀-paratypes collected on *Elaeis guineensis* Jacq. (Palmae) (H. Cardoso); coll. No. 3032. The holotype and eleven paratypes are deposited in the National Collection of Insects, Plant Protection Research Institute, Pretoria; one paratype has been presented to the British Museum (Nat. Hist.), London; and one paratype to the U.S. National Museum, Washington, D.C.

This new wax scale has a very close affinity with *Gascardia uvariae* (Marchal, 1909), which was described from Labe', Guinea, on specimens collected on *Uvaria* sp. (Annonaceae). However *G. constricta* differs from it in the absence of the tibio-tarsal articulatory sclerosis and a strong reduction of the number of the stigmatic spines. In *uvariae* the latter are about twice as many. These findings rest on notes and sketches taken years ago on three paratypes of Marchal's species, all in an advanced stage of maturity and in poor condition.

Saccharicoccus sacchari (Cockerell, 1895)

MATERIAL EXAMINED. ANGOLA. Benguela, 23.viii.1966, on *Saccharum officinarum* Linn. (Graminaceae) (H. Cardoso).

Saissetia miranda (Cockerell & Parrott, 1899) stat. nov.

Lecanium oleae mirandum Cockerell & Parrott, in: Cockerell, 1899: 12

Saissetia oleae miranda (Cockerell & Parrott); Fernald, 1903: 206

Saissetia oleae: Sanders, 1909: 440

This black scale was discovered on the south eastern coast of Mexico and it was originally described by Cockerell & Parrott (in: Cockerell, 1899) as variety of *Lecanium oleae* (Bernard, 1782). Sanders (1909), after examining typical material, came to the conclusion that the two insects were identical. However, a re-examination of type specimens deposited in the U.S. National Museum, Washington, D.C.* disclosed that Cockerell & Parrott's variety is actually a form specifically distinct from the common black scale. This opinion is based on the shape and number of the setae of the marginal fringe. In *miranda* the setae are flattened and variously frayed at the apex and twice as many as in *oleae*.

Supplementary material at hand indicates that *S. miranda* is widely distributed in the area of the Gulf of Mexico.

Saissetia neglecta spec. nov., fig. 4

Living material not seen. Adult females at maturity strongly convex with the dorsal H-mark fairly well developed. Mounted young adult females broadly oval to nearly circular in outline; dimensions of the graphotype: length 1.4 mm, width 1.0 mm.

*Fragments of three old specimens mounted in one slide were seen.

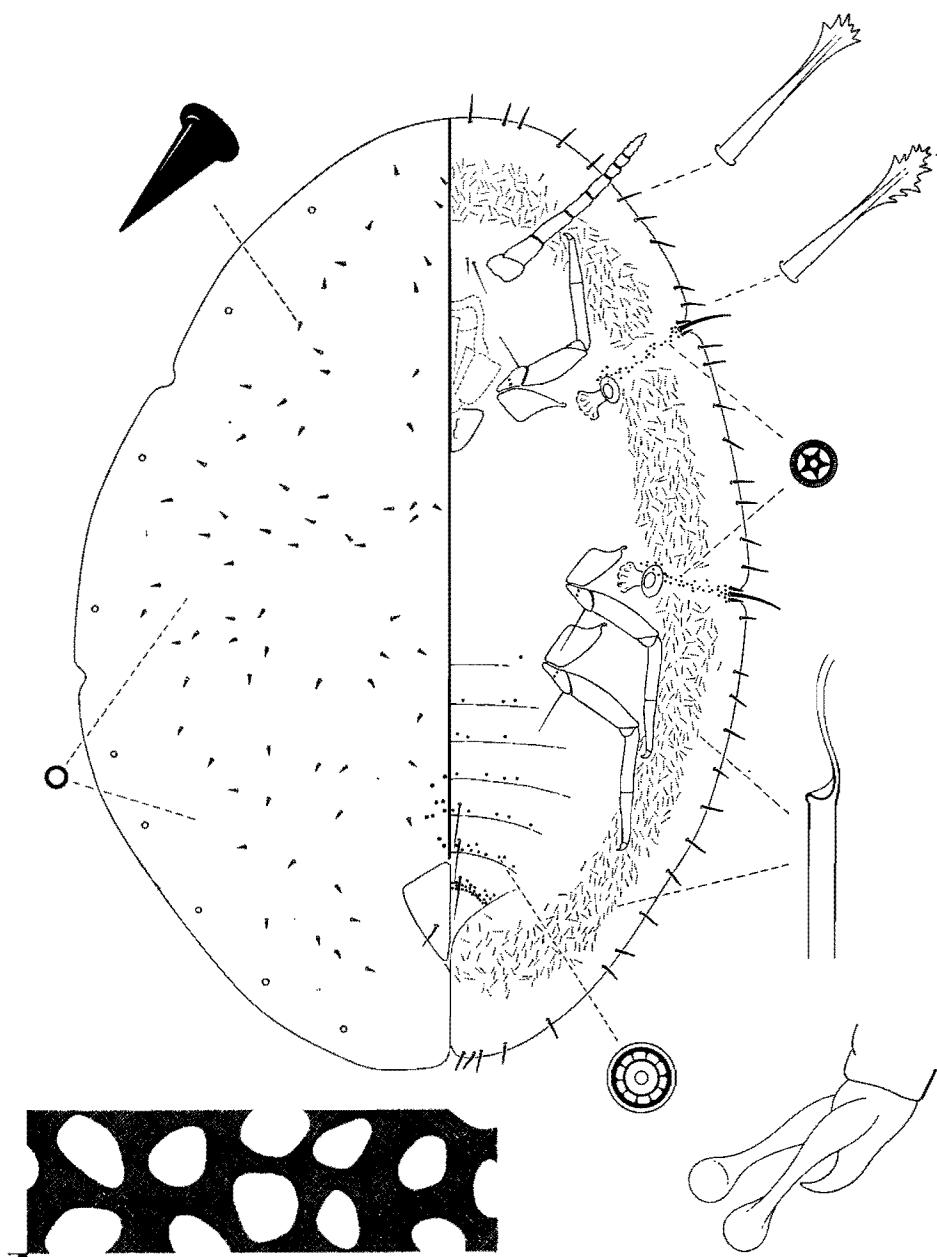


Fig. 4. *Saissetia neglecta* spec. nov.

Dorsal dermis marked with very numerous irregularly rounded, ovoid, or polygonal clear areas set close together and not appreciably differentiated in size. Each clear area encloses a small circular pore, the inner structure of which could not be observed. Dorsal setae robust, strongly conical, and distributed without any pattern. Para-opercular pores highly convex to dome-shaped, slightly variable in diameter and arranged in an irregular group of 9 to 20 in front of the anal opercula. Submarginal pores 13 to 19 altogether. Anal opercula roughly quadrate with a fairly stout subdiscal seta similar to those of the marginal fringe, and three very small, finely pointed ones at the apex; outer angle pointed or rounded; posterior lateral margin slightly curved; posterior anterior one straight; length of each operculum 155–160 μ , combined width 155–175 μ . Setae of the marginal fringe flattened and rather deeply and variously frayed at the apex; length 40–55 μ . Among these setae are occasionally and irregularly intermingled a few others which are either pointed or bi- or tri-furcate, and shorter, being only 20–30 μ long. On the margin of the body between the anterior and posterior stigmatic clefts are inserted 6 to 10 large setae and up to 3 small ones. Stigmatic spines three; median 70–85 μ long, laterals 20–30 μ . Multilocular pores crowded around the genital opening and extending in loose segmental transverse rows as far as the metathorax. Quinquelocular pores set in irregular bands two pores wide. Clistostomatic ducts numerous and arranged in a ventral submarginal band as typical of the genus. Legs well developed without tibio-tarsal articulatory sclerosis; ungual digitules not differentiated in shape or size, both knobbed at the apex; dimensions of L (iii): trochanter plus femur 145–175 μ ; tibia plus tarsus 155–195 μ . Antennae with seven or eight segments; total length 275–320 μ . Fold of the ano-genital invagination normally with 6 to 8 robust setae altogether. Urosternites (viii) to (vi) each provided with a couple of robust submedian setae.

MATERIAL EXAMINED. U.S.A. Florida, Pine Island: 15.v.1969, ♀-holotype and 23 ♀-paratypes collected on grapefruit [*Citrus* sp. (Rutaceae)] (C. W. McCoy); coll. No. H.C. 3745. The holotype and fourteen paratypes are deposited in the National Collection of Insects, Plant Protection Research Institute, Pretoria; six paratypes have been presented to the U.S. National Museum, Washington, D.C.; and three to the British Museum (Nat. Hist.), London.

This new species differs from *S. miranda* in the strong reduction of the number of marginal setae and in the total absence of the tibio-tarsal articulatory sclerosis.

A quantitative approach to the systematic position of *S. miranda*, *neglecta* and a group of closely related species together with notes on their distribution is in preparation.

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REFERENCES

COCKERELL, T.D.A. 1899. Aleurodidae and Coccidae, in: *Biol. Centr. Am.* **2** (2): 1-37.

DE LOTTO, G. 1969. The mealybugs of South Africa, ii (Homoptera: Pseudococcidae). *Entomology Mem. Dep. agric. tech. Serv., Repub. S. Afr.* **20**: 1-30.

FERNALD, M. E. 1903. A catalogue of the Coccidae of the world. *Bull. Mass. agric. Exp. Stn* **88**: 1-360.

SANDERS, J. G. 1909. The identity and synonymy of some of our soft scale insects. *J. econ. Ent.* **2**: 428-48.

STEINWEDEN, J. B. 1929. Bases for the generic classification of the coccoid family Coccidae. *Ann. ent. Soc. Am.* **22**: 197-245.

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